MARINE REVIEW.

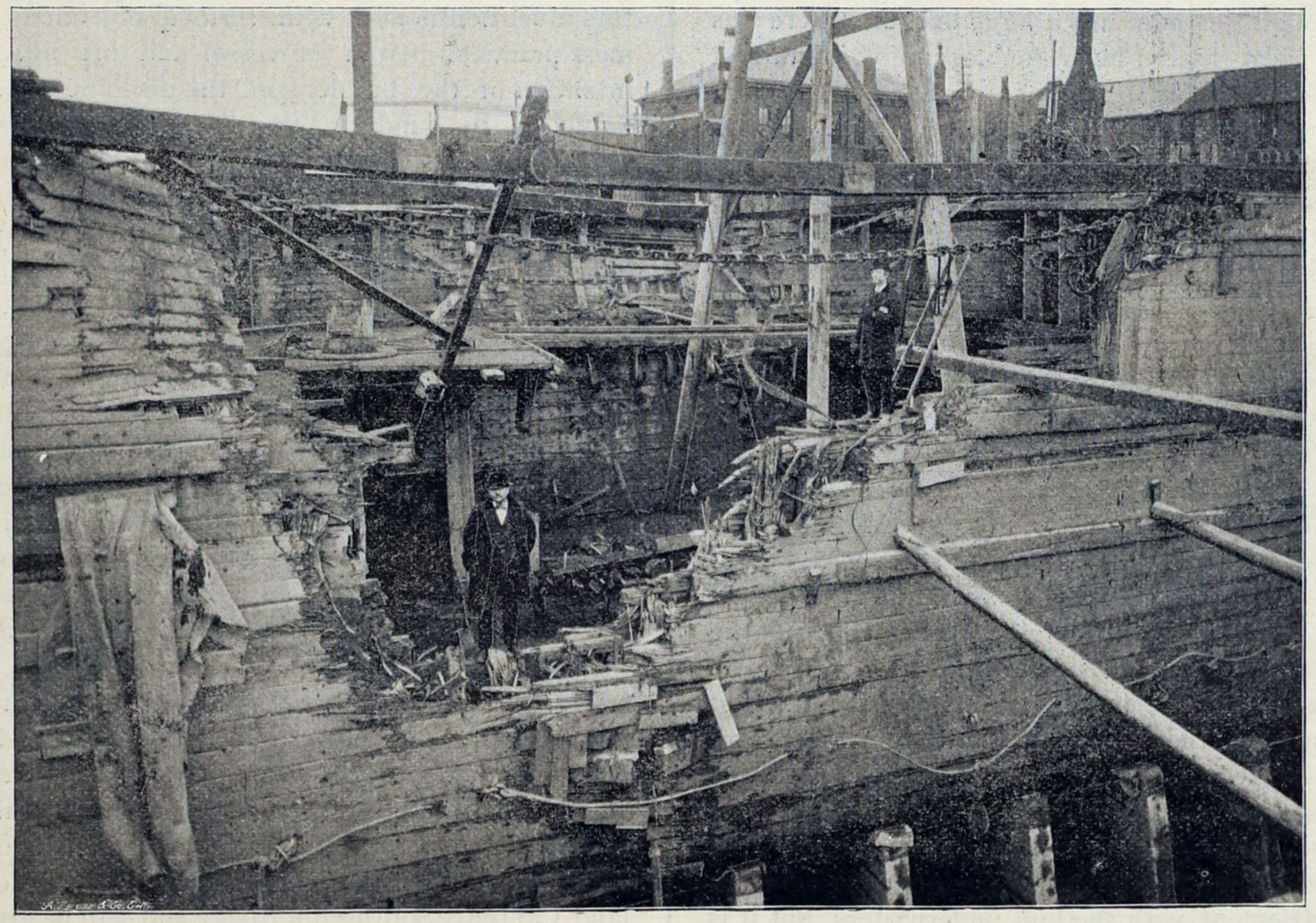
VOL. V. CLEVELAND, OHIO, THURSDAY, FEBRUARY 11, 1892. No. 7.

Steamer Kasota in Dock.

The accompanying engraving presents a view of the wrecked steamer Kasota, as she appeared in the big new dock of the Detroit Dry Dock Company a short time ago, when stripped of the canvas jacket and other material used by the wreckers in raising her from the Detroit river. A big force of workmen is now engaged in rebuilding the boat and she will be owned, when completed, by Aaron A. Parker and others of Detroit, who have purchased her for $80,000, repairs to include everything fitting the boat for sea. Her rebuild will cost, it is figured, $50,000 and will be most thorough in every way. This will include new keelsons with steel plates alongside, similar to those in Davidson's big four, and other strengthening material intended to make the boat stronger than when first built. The name Kasota will very probably be changed, new cabins will be built throughout and the steamer will appear altogether new.

The Kasota was sunk on the evening of July 17, 1890, just above Smith's coal dock, Detroit river, in collision with the passenger steamer City of Detroit. The engraving showing the demolished condition of the hull will hardly prove a surprise to anyone acquainted with the details of the collision. The Kasota was struck diagonally on the port side, just forward of the mainmast, and the bow of the City of Detroit extended 20 to 30 feet out from the starboard side of the wreck after the collision. Shortly after the accident Joseph G. Falcon of Evanston, Ill., began the work of raising the Kasota and, although she was not delivered in dry dock until late last fall, the job of wrecking was a wonderful feat accomplished under many disadvantages. The Kasota is the thirty-seventh wreck raised by Capt. Falcon with his process of sinking casks filled with water, and afterwards forcing the water out by means of compressed air when the casks are secured in the hold and to the sides of the vessel. At the time the Kasota was raised the casks in her hold that had not been filled with air represented 40 tons of unused power. A deck hoist engine worked the compressor, and a common hose line was used between the compressor and casks. Capt. Falson was to have received $25,000 or the boat if the wreck had been raised within a specified period. He failed to fulfill the time portion of his contract, but it is understood that he was finally paid $23,000 and also derived a profit from the cargo of iron ore taken out of the boat.

The work of repairing the Kasota is the first big job undertaken in the new dock of the Detroit Dry Dock Company. There is no doubt that it will be well done, and will even surpass the rebuild on the P. D. Armour.



STEAMER KASOTA IN THE DETROIT DRY DOCK COMPANY'S NEW DOCK.

Portage Lake Harbor of Refuge.

At Portage lake, thirty-six miles north of Ludington, on the east shore of Lake Michigan, a harbor of refuge with a 400-foot entrance has been under construction since 1879. The appropriations amounting in all to a trifle more than $100,000, has been so small each year as to necessitate a partial rebuilding with each expenditure. The loss of life on this shore each year is a constant reminder of the necessity of a harbor at Portage lake, and in addition there is a large local commerce that would be greatly benefited by such an improvement. It seems absurd that a work of this kind should be allowed to become partially useless through exposure and lapse of time between appropriations. Nothing but praise could be tendered the river and harbor committee if the coming bill contains a clause empowering the engineers in charge of several works of this kind to contract for the entire work and allow the appropriations to come in regular order. Mr. A. W. Farr of Onekama, Mich., was in Washington last week looking after Portage lake interests. He says that about $170,000 will be required to complete the work.

Contract Freight Market.

A depressed pig iron market still prevents sales of iron ore and there is no chartering of tonnage from either Escanaba or Marquette. Some ore from the head of Lake Superior at $1.25 a ton has been offered during the week, but the very small amount of Escanaba tonnage so far charteded at $1 is of little significance. Ore dealers can not sell their product on the freights demanded by vessel owners, and both interests are compelled to await a change in present conditions as regards pig iron. Sales of Bessemer ores made so far probably foot up 3,500,000 tons, and 2,500,000 tons of this is represented in the Carnegie purchases and those of the Illinois Steel Company. Some of the sales of Bessemer outside of these concerns were made on a margin of but 20 cents a ton over prices of last year, so that the ore dealer, considering freights, is really accepting a reduction of 10 to 15 cents. The available depth of water at the Sault on the 1st inst. was 6 inches lower than on the same date last year.

New Features in Collision Liability.

A short time previous to the close of navigation last fall, two of the Buffalo package freight carriers, the steamers New York and Conemaugh, collided in the Detroit river, just below the city of Detroit, and the Conemaugh was sunk. The steamer was afterward raised and docked with hardly as much expense as had been expected, although the sum was a large one, and there was in addition a very great loss in her valuable cargo of flour and merchandise of different kinds. The iusurance policies of both boats contained the collision liability clause, which has been so generally adopted on the lakes of late years; that is to say they were insured against loss to themselves, to any other vessel or to the cargo of any other vessel with which they might meet in collision. Neither vessel was insured, however, against loss to her own cargo through collision that might result from fault on the part of her officers, nor has any such feature in insurance been heard of on the lakes, as far as can be learned.

A question arises accordingly as to liability nnder peculiar circumstances that may arise in this case, and it is at least worthy of consideration. The attorneys in the case are Harvey D. Goulder of Cleveland and C. E. Kremer of Chicago. Mr. Goulder has given little attention to the possibilities of a new question of of liability arising from the collision, but Mr. Kremer is known to have given the matter serious thought. The owners of the Conemaugh have been joined by the underwriters on both vessel and cargo in the legal proceedings against the New York. Let it be admitted, however, that the Conemaugh, the vessel sunk with great loss to her cargo, is found entirely at fault, and the question then arises, who will satisfy the claim of the underwriters on the lost cargo? In any event, whether at fault or not, the owners of the Conemaugh being insured against collision damages, will find a settlement with the hull underwriters, but it is held in some quarters that if at fault they may be compelled to pay for the loss of their vessel's cargo. A division of damages in the case would seem to leave the matter still complicated, as the underwriters on the cargo of the sunken vessel will seek full compensation for their loss and must look to either the owners of the Conemaugh or their underwriters for payment of one-half of the loss. If, then, the Conemaugh's policy does not cover loss to her own cargo, it would seem that the owners will be compelled to pay some portion of the cargo loss, unless the finding of the court is entirely against the New York. The whole matter is certainly very interesting.

Rapid Handling of Coal and Iron Ore.

There is now in course of construction in Cleveland three plants for the rapid handling of coal and iron ore. All of them embrace ideas entirely new to the lakes, and if successful they are certain to cause a wonderful advancement in the special work for which they are intended. They have all been taken up by corporations having a fair amount of capital, and it may be expected that they will at least be given a trial in actual service during the coming season. The first, and probably the most important, is a machine invented by W. P. Thew of Cleveland and designed to trim the cargoes of vessels engaged in the ore trade and, with a great reduction in the working force engaged in the hold of the vessel, load the ore into buckets at lower lake ports, the buckets to be handled as at present with the successful hoisting and conveying plants now in operotion on all of the leading docks. This machine was described briefly a short time ago when representatives of the firms of Pickands, Mather & Co., M. A. Hanna & Co. and H. H. Brown & Co., examined it at the shops of the Globe Iron Works Company but additional interest is attached to it now, as it is understood that arrangements have been made for giving it a trial in two or three boats with the opening of navigation. The machine is a combination dredge and revolving crane, to be attached to the deck in the lower hold and to run from one end of the vessel to the other on an overhead railway. The dredge, or scoop of bucket form, is operated on a telescopic bar, so as to take up ore at different heights in the hold of the vessel, and the operator travels with the machine. The power required is not great and can be readily furnished without disadvantage to the vessel. As in all other cases of new machinery from which a great deal is required, this invention is met with serious objections from some of the most practical men in the vessel and ore business. It was the intention of the builders of the machine to accomplish a great reduction in handling charges with two of them in the hold of the vessel, one on either side, but they are met in this regard with the necessity of removing portions of the bulkheads in the large steel steamers where such a plant would be of benefit, or substituting six or more machines to correspond with the divisions of the hold. The additional cost of skilled labor, additional weight of the machinery and complications in it are also features that have caused unfavorable comment. It is to be hoped, however, that a trial will be made of the machine, as it is certainly a first step in the direction of a plant aboard vessels that will bring advancement equal to the rapid methods now in use on the docks. Trimming charges alone in the case of two or three big ore companies operating seven to ten steel carriers foot up $40,000 to $50,000 a year in a single fleet, and a machine that will even reduce this cost will be readily adopted.

The other machines, or dock plants as they may well be called, are intenned for soft coal and have both been described in the REVIEW. They are the product of the Lindsley and the Ludlow manufacturing companies. The Lindsley iron cylinder, which was built by the Cleveland Ship Building Company, is intended to take in and dump a car loaded with coal. This plant is now nearing completion at the docks of the Cleveland, Canton & Southern Railway and will be given a trial shortly. The plans of the Ludlow company are for a dock equipped with cranes capable of handling 5-ton buckets, the buckets to be so arranged on the sides of a platform track that the contents of coal cars can be completely dumped into them by letting down the sides of the cars. One of the great aims, of course, in all plants for handling soft coal on the lakes is to avoid the loss through breakage. Were it not for this, the ordinary system of chutes applied to the transfer of anthracite from cars to vessels might readily be applied in the bituminous trade.

Robert P. Thompson was taken into the Port Huron branch, E. M. B. A., Saturday, and John Cornwall and James Cavers were elected members.

The Union Dry Dock Company of Buffalo will build two steel steamers for the Union Steamboat Company, whose stockholders are interested in the shipbuilding company. Plans are not complete as yet, but the beginning of work on the boats will not be long delayed.

Iron Mining.

VALUE OF LEADING STOCKS.

Quoted by Chas. H. Potter & Co., No. 104 Superior St. Cleveland, O.

Stocks.	Par Value.	Bid.	Asked.
Cleveland-Cliffs Iron Company.....	$100 00	$.....	$ 78 00
Champion Iron Company.....	25 00	.....	70 00
Chandler Iron Company.....	25 00	47 50	50 00
Jackson Iron Company.....	25 00	.....	100 00
Lake Superior Iron Company.....	25 00	.....	*56 50
Minnesota Iron Company.....	100 00	80 00	82 00
Pittsburg Lake Angeline Iron Co.....	25 00	150 00	.....
Republic Iron Company.....	25 00	24 00	25 25
Ashland	25 00	.....	.....
Section Thirty-three.....	25 00	6 00	8 00
Brotherton.....	25 00	2 50	3 00

* Ex. rights.

Lake Superior mining stocks show a little improvement in prices each week and there is more trading in the market than for some time past. The big Norrie company announces an extra dividend of $5 a share and the famous Lake Angeline, which paid $25 a share last year, divided $3.50 a share for January, with every reason to expect that monthly dividends will continue as in the past. In the list of quotations Lake Superior is quoted "ex rights." As announced in a circular from the company, the capital is to be increased to 100,000 shares, an addition of 28,000 shares. Of this increase, 16,000 shares is held as treasury stock, while 12,000 shares is issued at par to stockholders with the right of one share of new stock for each six shares of old stock.

Investors in the old line of Lake Superior mining securities are slow in showing any interest in the new Minnesota properties, for the development of which two railways from Duluth are now being constructed into the Mesaba range. Significance is, of course, attached to the preparations of the management of the Minnesota and Chandler mines, Vermillion range, for mining this year 600,000 tons at the former and 500,000 tons at the latter mine, with possibly 50,000 or 75,000 tons more from the Pioneer and one or two smaller properties. Purchases of new locomotives and cars and the construction of new docks by the Duluth & Iron Range Railway are also considered of great importance in connection with the output of the Vermillion range next season, but whether the corporations controlling these mines have in view any other development work on a large scale in either of the ranges is not known. The Mesaba prospects are being boomed, however, and agents in Duluth are making great efforts to sell shares at high prices. Following are a few quotations received recently from a Duluth broker: Cincinnati Iron Company—Capital, $3,000,000; 120,000 shares; par value of shares, $25; treasury stock, 20,000 shares; all stock fully paid and non-assessable; selling price $5 per share. Lewabik Iron Company—Capital, $3,000,000; 30,000 shares; par value of shares, $100; treasury stock, 10,000 shares; all stock paid and non-assessable; selling price, $31 per share. Mountain Iron Company—Capital, $2,000,000; par value of shares, $100: treasury stock, 10,000 shares; all stock fully paid and non-assessable; selling price, $55 per share.

A. A. Carpenter of Chicago, who is known as one of the leading lumber dealers of the country, is a controlling owner in the Ludington mine, which has been flooded for some time past. As yet the mine management has not been able to control the water and it would seem that extreme measures will be required to put the mine in working order.

Supervising Inspectors and the Engineers.

Egbert P. Watson, editor of the Engineer of New York, is a member of the Marine Engineers' Beneficial Association and is admitted to the annual conventions of the organization. He publishes in the current issue of his journal a report of the convention, which contains reference to the session of the engineers at which members of the board of supervising inspectors of steam vessels were present. This feature of the convention was not referred to in the last issue of the REVIEW, which contained a report of the meeting otherwise complete. On the arrival of the inspectors, President Galwey announced that the engineers might state any grievances they had, and below is a report of what followed from lake representatives:

"Brother Thomas F. Dowd, Chicago, said that notwithstanding that some might say he was a professional kicker, the engineers employed on steamers and tugboats in his district labored under great disadvantages in being overworked. Their hours were too long, and undefined as to length, and there was really not enough men to handle the vessels, particularly if any accident occurred. Tugboats were run with only two men in the engine department, one engineer and one fireman, and they were on duty all hours. The local inspectors were not in fault, Brother Dowd held, and engineers had no complaint to make of them, but he said that some definite statement as to the hours of labor to be required of engineers of steam vessels should be made.

"Brother George Uhler of No. 69, New York, and national treasurer, spoke in much the same strain as regards short-handed crews in engine rooms on the great lakes, adding some testimony which he had received upon this subject. For his own part he had no complaint to make, as his vessel was fully manned, but for the good of the order at large it was evident that a reform was needed. Brother Uhler also spoke of the circumlocution and red tape involved in prosecuting violations of the steamboat inspection laws, showing that it was practically impossible to obtain a conviction under the present system. Papers were bandied about from one officer to another, each one protesting that it was out of his jurisdiction, the result being that nothing was done. Vessel owners knew this very well and simply defied prosecution. Brother Hinman of No. 57, Rondout, N.Y., said that something should be done in regard to the special license clause, for as it was carried out at present, men who were wholly incompetent got into important places where skilled men were required. He mentioned an instance of a ferry boat in his district which proved his allegations, and showed the urgent need of a stricter supervision of special license men.

"Brother Lawrence Gebhart, No. 1, Buffalo, N. Y., spoke of the inconsistencies of allowing persons to hold licenses merely because they could pass a categorical examination, but were actually without the practical experience necessary to handle their engines successfully; he thought that more stringent examination into the practical experience of candidates should be required.

"Brother J. B. Wood, No. 2, Cleveland, O., also spoke of the inconsistency of granting licenses to men who could merely pass examinations, and cited a case where a man who was able to answer the questions put to him obtained a license as chief engineer in a very short time from his first essay as a marine engineer. He had actually been afloat only seven months and twenty days when he got a license as first assistant engineer, and the very next season obtained one as first class chief engineer. The speaker thought that this was a rank injustice to others, in which view many will be disposed to agree with him.

"In reply Gen. James A. Dumont, supervising inspector general returned thanks for the interview afforded, and said the department under his charge had always felt that the more they were able to do for steamboat men to ameliorate their condition, the better it was for all concerned, and that while he could not commit the department to any special changes, or to do all that was asked of it the department was disposed to do all that it could."

Marine City's Branch of the E. M. B. A.

Special Telegram to the MARINE REVIEW.

MARINE CITY, Mich., Feb. 11—Marine City lodge, No. 8, was organized here last evening by Deputy Grand President Alex. R. Sinclair and Grand Financial Secretary W. A. Collier, assisted by Grand Officers R. E. Gain and J. H. Ivers. Seven of the members are withdrawals from sister lodges and nineteen are newly elected. Officers elected are Thos. E. Walker, president; Ed. Allum, first vice-president; Geo. A. Shaw, second vice-president; Richard A. Cottrell, treasurer; W. A. Scott, financial secretary; W. H. Brown, recording secretary. The appointed officers are: Charles H. Cartright, chaplain; Walter Cottrell, marshal; Fred. G. Marsden, warden; Andrew Yax, sentinel.

CHICAGO LAKE INTERESTS.

WESTERN OFFICE, MARINE REVIEW,
No. 210 So. Water Street, CHICAGO, Ill., Feb. 11.

The deadness in lake grain freights is no indication of what can be expected later on. I have talked with several shippers and vessel brokers this week, and the general sentiment was that the movement of corn would be great as the time of opening approaches. One prominent shipper told me that he had thirty-two elevators in Nebraska well filled with corn, all of which would move when navigation opened. There is no particular benefit to be derived from getting this corn into Chicago elevators months in advance of the time for its forward movement. The grain trade in the west has largely passed out of the hands of so-called receivers into the control of elevator companies, which own elevators throughout the west. The grain is handled to yield the largest profit. As it is sold for future delivery as soon as it is gathered into elevators, there is no particular risk in the business. If the anti-option bills now pending in Congress become laws the entire business of shipping grain must be remodeled and in the era of transition it is very likely that the marine interest will suffer severely. Conservative shippers say that the proposed laws will largely prevent the free and untrammeled movement of corn in a steady stream, and instead of that, we will have a great rush of grain, followed by a time when little or nothing is moving. Then there will be another flood and ebb. Nothing could be more disastrous to vessel property. But to return to grain rates. The last charter reported was of the Neshoto at 3½ cents for corn to Buffalo. Several agents quietly dropped out when that rate was made, preferring to take chances along in March. The lines are doing nothing in the way of chartering.

Chicago vessel owners are disposed to take Escanaba ore this season in preference to Two Harbors or Ashland at the present ratio of rates. Outside of the difference of the size of cargoes from Lake Superior and Escanaba, the perils of St. Mary's river are a prominent factor in their figuring. They don't like to risk their boats where so many disasters occurred last season, unless they are well paid for it.

Chicago marine men are generally taking life easy this winter. T. T. Morford has just returned, brown as a berry, from a month's sojourn at St. Augustine, Florida. D. B. Linsted is regaining his shattered health at San Diego, Cal. His friends feared when navigation closed last fall that he had done his last season's work. Hugh MacMillan has returned from a trip to his olive grove in southern California, and is engaged in starting up his ochre mill in Kansas City. His son will manage the enterprise. His ranch in Kansas has a large mine of pure ochre, and it is that which he is now developing. W. M. Egan is in the west, and J. C. Evans will return from Europe March 6.

In the way of vessel transfers there is so little doing that it is not worth mentioning. It is in fact the quietest winter in that regard Chicago has seen for a long time.

Owners of the lumber carriers are said to be already "rattled" over business next season, and are looking for season contracts at ridiculously low rates. If the stampede among lumber carriers can be checked, there may be some money made next season, but the outlook now is not that way.

Capt. W. W. Bates' fate causes much regret among his old friends here. "Just like Bates!" one of them said, in speaking of his row with Secretary Foster.

Two Old Mariners.

Special Correspondence to the MARINE REVIEW.

MILWAUEE, Wis., Feb. 11.—Death called away two of Milwaukee's oldest mariners last week. Both had lived in retirement for years and were no longer connected with lake interests in any manner. Capt. Jasper Humphrey passed away at his home in this city on the morning of the 2nd inst., and Capt. William Porter at his home in Waukesha, on the morning of the 3d. Capt. Humphrey would have attained the age of 80 on the 15th of March, while Capt. Porter was in his 76th year. Capt. Humphrey came to the lakes from Steuben county, N. Y., where he was born, and as a sailor before the mast as early as 1834 or 1835 paid a visit to Fort Howard and Green Bay on a vessel laden with supplies for parties engaged at that time in building what was known as the Military road. He became a resident of Milwaukee in the 40s, and on three different occasions was elected to office, twice to the common council and once to the legislature. The ship chandlery business, in which he was engaged during these years, proved unprofitable, hence he returned to the lakes in the capacity of master. His commands embraced several crack vessels, such as the schooner H. L. Lansing and barkentine Indiana. He also had charge of steam vessels during brief periods. At one time he took a lake schooner, which is claimed to have been the Augusta that sank the steamer Lady Elgin, although the data concerning the vessel is somewhat obscure, across the Atlantic and back, and was out with her in a severe gale which caused the Great Eastern to lose her rudder. Later he took the lake schooner Indus to the Atlantic coast, and the lake brigantine Sailor Boy to the West Indies. After his final retirement from the lakes, he served several terms as harbor master here. Capt. William Porter, who was a native of Ireland, became a resident of Milwaukee in 1837. His intimate friends remember him as captain of the schooners Michigan, Cleopatra and Kirk White. He also built and sailed the schooner Mariner, and jointly with his brother James built and owned the schooner Liberty. His last command was the schooner Phalarope, in which he owned an interest. After leaving the lakes, he and his brother owned and managed the principal line of tugs here which netted each a handsome competency. He was also interested in the schooners Porter and Itasca until their sale to lower lake parties. Capt. Porter had lived in retirement since 1876.

G. H. Couvrette, last season mate of the steamer Indiana, has invented an improvement to rudders, which prevents them becoming unshipped in heavy weather. He has also perfected an automatic log and a new system of steering gear which can be applied at less cost than steam steerers.

According to the custom house records there were 90 arrivals and an equal number of departures during the month of January. Shipments across Lake Michigan included 342,761 barrels of flour, 42,000 bushels of wheat, 28,000 bushels of corn, 20[illegible],586 bushels of barley, 55,000 bushels of rye and 10,000 bushels of oats.

Sales of vessel property recorded at the Milwaukee customs office during the past week were as follows: Schooner Persia, Evan Johnson to Samuel Martin of Racine, the whole, $300; schooner Christiana, Martin Gunderson to Peter Hauke of Sheboygan, the whole, $300; schooner Rosabelle, N. P. Peterson to Herman A. Schroeder and William Fairweather of Sheboygan, the whole, $1,800.

Capt. A. E. Shepard, who owned and commanded the steamer Mary Jarecki a few years before her loss on Lake Superior, but who is now located in Texas and the possessor of a 100,000 acre sheep ranch, paid a business visit to Milwaukee. Capt. John A. Connelly, late of the steamer City of Marquette and City of Fremont, will command the new steamer now on the stocks at Sheyboygan.

To Organize a Branch of the E. M. B. A.

Special Correspondence to the MARINE REVIEW.

TOLEDO, O. Feb. 11.—A move is being made to organize a branch lodge of the Excelsior Marine Benevolent Association at this port. It is expected that a meeting of mariners holding masters' certificates will soon be called. Toledo has about twenty-five or thirty who are eligible

The Toledo Marine Railway, Miller & Scanes proprietors, is building for Geo. H. Breyman & Bros. the two largest dump scows on the lakes. They are 120 feet long, 27 feet wide and 10 feet deep. They will have six pockets and iron rollers 5½ feet in diameter; capacity 330 yards on 8½ feet draft or 400 yards loaded down.

Captain James St. Clair, superintendent of the Dunham Towing and Wrecking Company of Chicago, was in this city this week.

No Contracts of Any Kind.

EDITOR MARINE REVIEW—On my return to the city I notice in your issue of Jan. 21, under the head of "Ore Sales and Freight Contracts" that the Northern Steamship Company is said to have taken an amount of ore for transportation next season, under a contract rate. The information is erroneous, as this company has no contracts on ore or any other commodity for the season of 1892.

JOHN GORDON,
Gen'l Manager.

Buffalo, N. Y. Feb. 9.

Buffalo's Grain Elevators.

Buffalo elevators used for storage and in running order at the close of navigation last fall were as as follows:

Name.	Capacity, bushels.	Name.	Capacity, bushels.
Bennett	800,000	Niagara A	800,000
Brown	250,000	Niagara B	1,200,000
City	600,000	Niagara C	200,000
C. J. Wells	500,000	Queen City, A, B & C	450,000
Coatsworth	1,200,000	Richmond	250,000
Connecting Termimal	950,000	Schreck	50,000
Dakota	850,000	Sternberg	150,000
Erie Basin	200,000	Sturges	300,000
Evans	400,000	Swiftsure	150,000
Exchange	500,000	Ontario	450,000
Frontier	650,000	Tifft	350,000
International, (Black Rock)	650,000	Union	90,000
Flax Seed, (Kellogg & Co.)	65,000	Watson	600,000
Lake Shore	300,000	Wheeler	350,000
Lyon	100,000	Wilkeson	400,000
Marine	125,000	William Wells	200,000
National and Globe Mills, N. Y., L. E. & W.	100,000 / 720,000	Total	15,950,000

The Lake Shore, International (Black Rock), and Queen City, A, B and C (on Clinton avenue) are for elevating from railroad cars only.

☞SEND YOUR ORDER FOR "PATTERSON'S NAUTICAL DICTIONARY" ($5) TO THE "MARINE REVIEW" AT ONCE.

Quaint French Documents.

[BY J. W. WALTON.]

A curious decree was promulgated by Louis XV. and his council on the 28th of January 1716, touching the payment of head money for the privilege of engaging in the slave trade.

Upon representations made to the king, being in his council; by divers merchants of the kingdom, that they have obtained from the late king permits for the trade in negroes on the coast of Guinea, to transport them thence to the islands of America, upon an undertaking which they have entered into to pay thirty livres ($6.00) for each one of whom they shall land on the island of San Domingo, and fifteen livres ($3.00) for those whom they shall land on the Windward isles, the whole for the maintenance of the forts and offices established on the said coast of Guinea; and that certain of their ships having arrived they do not know into whose hands they ought to pay the said sums and get their receipts, and their request, if it please the king to settle this question for them.

"The report being heard, the king being in his council, with the advice of his uncle regent, has decreed, and does decree that the merchants of the kingdom who have taken out licenses since the month of November, 1713, to send their vessels to the coast of Guinea to trade in negroes, and who have transported them thence to the French islands of America, shall pay into the hands of the treasurer general of marine on duty, for each head of blacks that they shall land at the islands and coast of San Domingo and at the Windward isles, the sums mentioned in their contracts, and conformably thereto, upon which their contracts shall be surrendered to them and they shall thereupon be and shall remain well and truly quit and discharged.

"Done at the council of state of the king, his majesty being present, held at Paris the twenty-eigth of January 1716.

[Signed.] PHELYPEAUX.

The executive order is appended, very quaint and tedious, legal verbiage not being a modern invention.

The day following an edict was published prohibiting all commerce with the South seas; Louis' faithful ally, King Phillip V. of Spain, having reserved that trade for his own nation.

Louis, by the grace of God king of France and of Navarre, to all who shall see these present letters, greetings: Whereas, the late king of glorious memory our highly honored lord and ancestor,* has expressly forbidden all merchants, shipowners, captains and masters of vessels of our realm to hold any voyage navigation or commerce with the South sea; since by the treaty of peace, which was concluded at Utrecht it was understood and reciprocably promised that the commerce and navigation in foreign countries dependent upon the king of Spain shall continue precisely as they were during the reign and until the death of the most Catholic King Charles II, that all nations should obey the ancient laws and regulations made on behalf of the said commerce and navigation; the resolutions we have formed to preserve inviolate the said treaty, has made us think it necessary to renew the prohibitions already made, and to even impose severer penalties against its infraction.

Upon these facts, with the advice of our dear and well beloved uncle the Duke of Orleans, regent, of our dear and well beloved cousin, the Duke of Bourbon, of our dear and well beloved uncle the Duke of Maine; of our dear and well beloved uncle the Count of Toulouse; and other peers of France; great and notable personages of our kingdom; and with our certain knowledge, full power and royal authority, we, by these presents, signed by our own hands, again set forth a strict prohibition unto all merchants, brokers, or others of our kingdom to form any commercial enterprise and to send any vessels to the South seas. And to all owners, captains and officers of ships, master pilots, marine officers, and, generally, to all our subjects of whatever quality or condition they may be, to hold any voyage, navigation or commerce in the said sea, under any pretext whatever, under penalty of the confiscation of the vessels and of their cargo, and of death to the captains and commanders of said vessels.

We decree that if any of the said captains or commanders should die in any port of the South sea where he shall have engaged in commerce contrary to the tenor of this prohibtion, which ever officer who shall succeed him as commander of the vessel, shall draw up a report of all that shall have been done in contravention of this statute by the said deceased captain, and fit out at once and set sail for France, allowing neither loading nor unloading of cargo, under like penalty of death.

We further ordain, subject to the same penalties, that if any of the aforesaid captains or commanders of the said vessels should die en-route for the South sea the officer who then assumes command shall break the voyage and return to France with the ship and cargo, or at least take the vessel to some other place where commerce and navigation are not prohibited.

Nearly a page of formalities follow, verbal repetition and descriptions of the great seal of yellow wax with which the royal edicts were ornamented and rendered valid. The reader will excuse these formalities, no doubt, gladly consigning them to the limbo where alone is found, at present, the "divinity" that "doth hedge a King."

* Louis XIV was his great grandfather.

Right and Left Instead of Starbord and Port.

Since July 1 last the old words of command "starboard" and "port" have given way to "right" and "left" on the ships of the North German Lloyds and the Hamburg-American lines, and the old masters who were very much opposed to the change now say that it has been attended with most satisfactory results. The new orders were brought about through the conflict in commands and the manner of their execution, mainly, of the change from steam to sail. On the lakes this subject has received a great deal of attention, especially from the fact that the crossing of wheel chains in a large number of steam vessels makes conditions even more complicated. Another annual meeting of the supervising inspectors of steam vessels has been held within the past week, and nothing has been done in the matter of asking that a uniformity in straight or crossed chains be adopted, but it is interesting to note the success attending the sweeping change made by the two Atlantic companies. As soon as the order "right" is given under the new rules on these boats, the telegraph is moved to the right, the wheel is revolved to the right, the ship turns to the right, the rudder indicator points right, the rudder itself moves right, and the steering mark on the compass as well, and so *vice versa* when the order left is given. Nothing can be simpler, and no possibility of mistake can arise.

The Nautical Magazine in speaking of this new order of things says: "The objection has been raised that the new words of command are not international, and therefore illegal. This statement, however, will not hold good, as both English and American pilots, in whom every one has confidence, have made no difficulties in using the new words of command when piloting ships of the two before mentioned companies."

Importance of Experimental Tanks.

"The bureau recommends the immediate construction of an experimental tank, for use in determining the resistance of ships by means of models. In preparing the designs of new vessels of novel types, the want of such apparatus has been greatly felt in the past, and with the high speeds now so generally used its importance is constantly increasing. Mr. William Denny, one of the most progressive and well informed Scotch ship builders, in a letter written in 1887 relative to the importance of the assistance that an experimental tank may render to the naval designer, expresses himself as follows:

'The truth is that of all the problems about a steamship the only one at the present moment incapable of being solved by *a priori* methods in extreme cases is that of the speed and power. No ability and no training will enable even the most skillful naval architect to overcome the want of an experimental tank in coping with these questions. My partners are so firmly convinced of the value of the tank that every one of them regards the large amount of money sunk in it in the form of a capital, and the large amount still to be sunk in it, as one of our best investments, and have met without grudging the annual outlay required for its administration'."—Annual Report of Chief of Construction, United States Navy.

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MARINE REVIEW.

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

JOHN M. MULROONEY, ... } PROPRIETORS.
F. M. BARTON, ... }

HOMER J. CARR, - - - Associate Editor and Manager Chicago Office, 210 South Water Street.

Published every Thursday at No. 510 Perry-Payne Building, Cleveland, O.

SUBSCRIPTION—$2.00 per year in advance. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,510 vessels, measuring 1,063,063.90 tons in the lake trade. In classification of this fleet the lakes have more steamboats of 1,000 to 2,500 tons than the combined ownership of this class of vessels in all other sections of the country. The classification is as follows:

Class.	Number.	Tonnage.
Steam vessels	1,527	652,922.25
Sailing vessels	1,272	328,655.96
Canal boats	657	67,574.90
Barges	54	13,910.09
Total	3,510	1,063,063.90

According to the report of William W. Bates, United States commissioner of navigation, 46 per cent. of the new tonnage of the country was built on the lakes during 1889. This is a percentage greater than the work of the Atlantic coast and western rivers combined, and almost equal to the whole work on the Atlantic and Pacific coast. In 1890 the tonnage built on the lakes is but very little less than that built on the Atlantic and Gulf coasts. Tonnage built on the lakes during the past five years was as follows:

	No. of boats.	Net Tonnage.
1886	85	20,400.54
1887	152	56,488.32
1888	222	101,102.87
1889	225	107,080.30
1890	218	108,515.00
Total	902	393,597.03

St. Mary's Falls and Suez canal traffic: Number of boats through St. Mary's Falls canal in 1890, 234 days of navigation, 10,557; tonnage, net registered, 8,454,435. Number of boats through Suez canal during 1890, full year, 3,389; tonnage, net registered, 6,890,014.

Entered at Cleveland Post Office as Second-class Mail Matter.

LAKE shipbuilders at a meeting in Cleveland, Tuesday, took action in the matter of abrogating the 1817 treaty which prohibits the building of war vessels of any kind on the lakes. They should have been heard of on this subject long ago. The whole country now knows that the lakes have some of the greatest ship and engine building plants in the country. It is held by some that no treaty exists, but uncertainty in the matter has been a great drawback to the lakes and the present movement will bring the subject before Congress. The treasury as well as the navy department has been giving attention to this question, as shown by Lieut. Crofton's visit to all the lake shipyards a short time ago. The treasury department is desirous of placing a number of efficient and well-batteried revenue cutters of modern design on the lakes, and in the opinion of the solicitor of the treasury no treaty exists to prevent the construction and equipment of revenue vessels on these waters. The solicitor holds that the 1817 treaty was formally abrogated by an act of Congress of the date of Feb. 9, 1865, and that despite the mutual arrangement entered into later by Secretary Seward and the British minister, Sir Frederick W. A. Bruce, that the stipulations should remain in force, the statutes fail to show that Congress ratified any such arrangement.

IN Washingtou it has been said by officers of the treasury department as well as some members of Congress that Wm. W. Bates, who was dismissed from the office of commissioner of navigation a few days ago, was disposed to meddle in affairs beyond the plane of his office, and that his dismissal was not due entirely to objectionable matter in his annual report. Mr. Bates is known to be very outspoken in regard to his convictions, and he was not liked, on this account, by representatives of some interests in the merchant marine. It can not be said of him, however, that he was not a very able man in the office. He was a recognized authority on maritime matters. Of his successor, Edward C. O'Brien of Plattsburg, N.Y., little is known on the lakes.

SENATOR Sawyer has introduced a bill to repeal the objectionable line carrying projectile law, but it would seem as though there may yet be considerable objection even to the repeal of the law as regards the lakes. In accordance with a resolution from the Senate that body has been furnished with the proceedings of the board of supervising inspectors of steam vessels, assembled in special session in September last to consider the matter. Although the inspectors recommend the repeal of the law as regards the lakes, it is evident that the manufacturers of the life-saving appliances will present some opposition to such a proceeding.

MARCH 3 is the date set for the annual meeting of the Lake Carriers' Association at Buffalo. Some changes are proposed in methods of the organization, and reference to its affairs may be expected in the next issue.

Grain in Store at Chicago and Duluth.

The following table shows stocks of wheat at Chicago and Duluth:

	Chicago.	Duluth.
In store, bu.	9,282,926	7,554,228
Afloat, bu.	442,745	400,703
Increase last week, bu.	40,627	158,169
Excess over same time last year, bu.	2,771,880	3,873,579

Stocks of corn in store at Chicago aggregate 1,103,026 bushels, against 272,404 bushels on the corresponding date in 1891. There is also 220,344 bushels of corn afloat in Chicago. Stocks of oats in Chicago foot up 813,739 bushels, against 415,965 bushels on the corresponding date in 1891.

Fifty-Second Congress—First Session.

The foliowing bills of interest to lake vessel owners have been introduced in Congress recently:

H. R. 5,165, Burrows.—Making an appropriation for the improvement of the harbor at South Haven, Mich.

H. R. 5,135, Miller.—Allowing to each commissioned officer of the revenue cutter service 10 per cent. of his current yearly pay for each term of five years of service, the total amount of such increase not to exceed 40 per cent on the yearly pay of the grade as provided by law. (A duplicate of this bill was introduced in the Senate by Mr. Sawyer.)

Engineers' Wages.

As announced last week, the Cleveland Vessel Owners' Association will regulate wages of engineers during the coming season according to the class of steamers on which they are engaged. It is of course impossible to class the boats so as to cover in detail all sizes of vessels and the different kinds of machinery. For this reason there is a difference of wages in the different classes and owners are expected to be governed in this regard by the size of the vessel and the trade in which she is engaged. The schedule decided upon, which is altogether higher than that of a year ago, is as follows:

1. Metal steamers having water bottoms and triple expansion engines—Chief, $115 to $125 a month; second, $75 to $80 a month.

2. Metal steamers not included in the first class and wooden vessels with triple expansion and compound engines, excepting smaller vessels which may be placed in the third class—Chief, $110 to $115 a month; second, $70 to $75 a month.

3. Smaller boats with high pressure or low pressure engines, or with compound engines, covering all boats not included in the first and second classes—Chief $80 to $100 per month; second, $60 to $70 per month.

Around the Lakes.

Charles Y. Osburn collector of customs in the district of Superior for the past ten years died at his home in Marquette last week.

Upson, Walton & Co. of Cleveland, last week made a shipment of the iron blocks for which they have the general agency to Switzerland.

The schooner Our Son, owned by Capt. Kelly of Milan, and sailed by Capt McKeighan, has received a $10,000 rebuild at the head of the old river-bed, Cleveland.

The Canadian Steel Barge Company has been incorporated at Port Arthur, Ont., with a capital stock of $128,000 to build steel vessels for freight and passenger service.

Duluth now has four vessel brokerage concerns. Lewis & Gilbert, 36 and 37 Exchange building are the latest. The partners are Capt. R. T. Lewis and Mr. S. V. Gilbert.

John Pridgeon, Jr., of Detroit is said to own one-half of the steamer Kasota now undergoing a rebuild in the big dock of the Detroit Dry Dock Company. A stock company will be organized for the management of the boat.

The wooden steamer, duplicate of the W. F. Sauber, which F. W. Wheeler of West Bay City is about to build for A. E. Stewart, C. F. Bielman, George Peck and others of Detroit, will be finished by July 15. Her cost is about $130,000.

Sales of vessel property: Side-wheel steamer Corona, Goodrich Transportation Company to J. J. Warde of Chicago, $15,000; Steamer O. O. Carpenter, Jenks Ship Building Company of Port Huron to N. E. Runnells and Capt. Dan Sinclair of Port Huron, $28,000.

Some recent steamboat appointments are: Emily P. Weed, Capt. Charles Burey, last season in the Northern line; Roswell P. Flower, Capt. Charles Davis; Kasota, Capt. John T. Hutton; John Oades, Capt. Timothy Lemay; Kittie M. Forbes, Capt. Rattray, last season in Grummond's line.

The work of lengthening the Cleveland Dry Dock Company's dock is being done by L. P. & J. A. Smith. The coffer dam has been put in. When completed the dock will be 364 feet over all, 350 feet on keel blocks, 52 feet on bottom, 52 feet width of gate and will have 16 feet on the blocks.

L. L. Burton, of Detroit, general agent for the Cincinnati Underwriters' Insurance Company, Capt. J. A. Calbrick, lately with P. H. Fleming & Co., and M. H. Cook, vessel owner of Michigan City, have formed at Chicago the firm of Burton, Calbrick & Cook, vessel and insurance agents.

The propeller James Fisk, Jr., will be given two steel arches and a thorough overhauling of hull and machinery at the Springwells dry dock this winter. Her hoisting machinery will be shifted, and this with the removal of the heavy wooden arches, will add materially to her carrying capacity.

The Northern Steamship line is to remain unchanged at present. President Hill is building three steamers on the Pacific to connect with the Seattle end of his Great Northern line, which is already in operation some distance east from Seattle. When this work is finished something probably will be done to strengthen the lake line.—Buffalo Courier.

The Canadian Marine Engineers Association held its annual meeting at Toronto and the following officers were elected for 1892: President, F. E. Smith; first vice-president, E. W. Fox; second vice-president, P. J. Kenney; council, R. Hughes, S. Gillespie, D. L. Foley, J. J. Kenney and P. Quinn; treasurer, J. H. Ellis; secretary, S. A. Mills; inside guard, J. Adams; auditors, J. Harrington and J. D. Banks.

The John Doty Engine Company, Toronto, has begun the construction of a side-wheel passenger steamer for the St. Catherines, Grimsby & Toronto Navigation Company. She is to be of steel and iron, 180 feet long, 44 feet beam, engines to be 1,200 horse power, to have accommodation for 600 passengers, and will cost $75,000. It is expected that she will be finished and in commission by the middle of June next.

The Buffalo branch of the Marine Engineers' Beneficial Association has been discussing the advisability of forming a separate beneficiary fund for the lakes and the subject may be brought to the attention of the national association at its next meeting. The movement is based on the claim that in some sections, such as the southern rivers, the mortality is much greater proportionately than on the lakes.

At a meeting held in Toronto last week the Canadian Marine Association elected officers as follows: Capt. Crangle, president; Thomas Marks, vice-president; W. A. Geddes, secretary and treasurer. A resolution of thanks to the government for giving Canadian ship owners a rebate on canal tolls was adopted, and the government was asked to complete the work of enlarging the St. Lawrence canals as speedily as possible.

E. D. Chilson of Tecumseh, Mich., and Moore & Barstow of Cleveland, are the parties interested in the purchase of the steamer Marquette from the Republic Iron Mining Company of Cleveland. Mr. Chilson was managing owner of the steamer Oscar Townsend, lost last season, and the Townsend's consort, the Kelly, will now tow with the Marquette. The Marquette was formerly the steamer Republic and was built in Cleveland in 1881. She rated A2 and was valued at $80,000 in Lloyds last season.

The Detroit Boat Works, Detroit, Mich., has ordered a 7x8 feet boiler, having 35 feet of grate surface, from the Roberts Safety Water Tube Boiler Co., New York. The Idler, built for Senator McMillan by the Detroit Boat Works, has a Roberts boiler that has been in use two years, and this second order is an endorsement of this type of boiler for steam yachts. Valuable data of performance of 100 steam vessels having these boilers, may be had by addressing the Roberts Safety Water Tube Boiler Co., 16 Cortlandt street, New York.

Plans are being made by the Detroit Dry Dock Company for the big transfer car ferry, which is to be operated in connection with the transfer St. Ignace at the Straits of Mackinaw, but as yet no contract has been let for the boat. The Michigan Central and Grand Rapids & Indiana railroads, owners of the St. Ignace, would sustain a big loss in event of an accident to the St. Ignace and they want another boat. The new ice crusher will be considerably larger than the St. Ignace, but will be on much the same plan. She will have similar powerful engines turning heavy screw wheels at both ends of the boat, will be built of wood and will cost about $350,000.

Ward's old Lake Superior line will in future be known as the Crescent line. Agents have been appointed as follows: A. P. Wakefield, Minneapolis and St. Paul; Alfred Robinson, Duluth; A. J. Otterson, Marquette; A. E. Thompson, Cleveland and H. L. Chamberlain, Buffalo. The masters and chief engineers will be as follows this season: John M. Nicol, Capt. Albert Stewart, Engineer Joseph Hayes; John V. Moran, Capt. Robert Rhynas, Engineer G. E. Lynn; W. H. Stevens, Capt. John Tyrney, Engineer G. E. Tretheway; Eber Ward, Capt. W. McLean, Engineer James Purvis; James Fisk Jr., Capt. Louis Elliott, Engineer Elmer Tucker; Samuel F. Hodge, Capt. Murray McIntosh (last year mate of the Moran), Engineer, W. T. Walker.

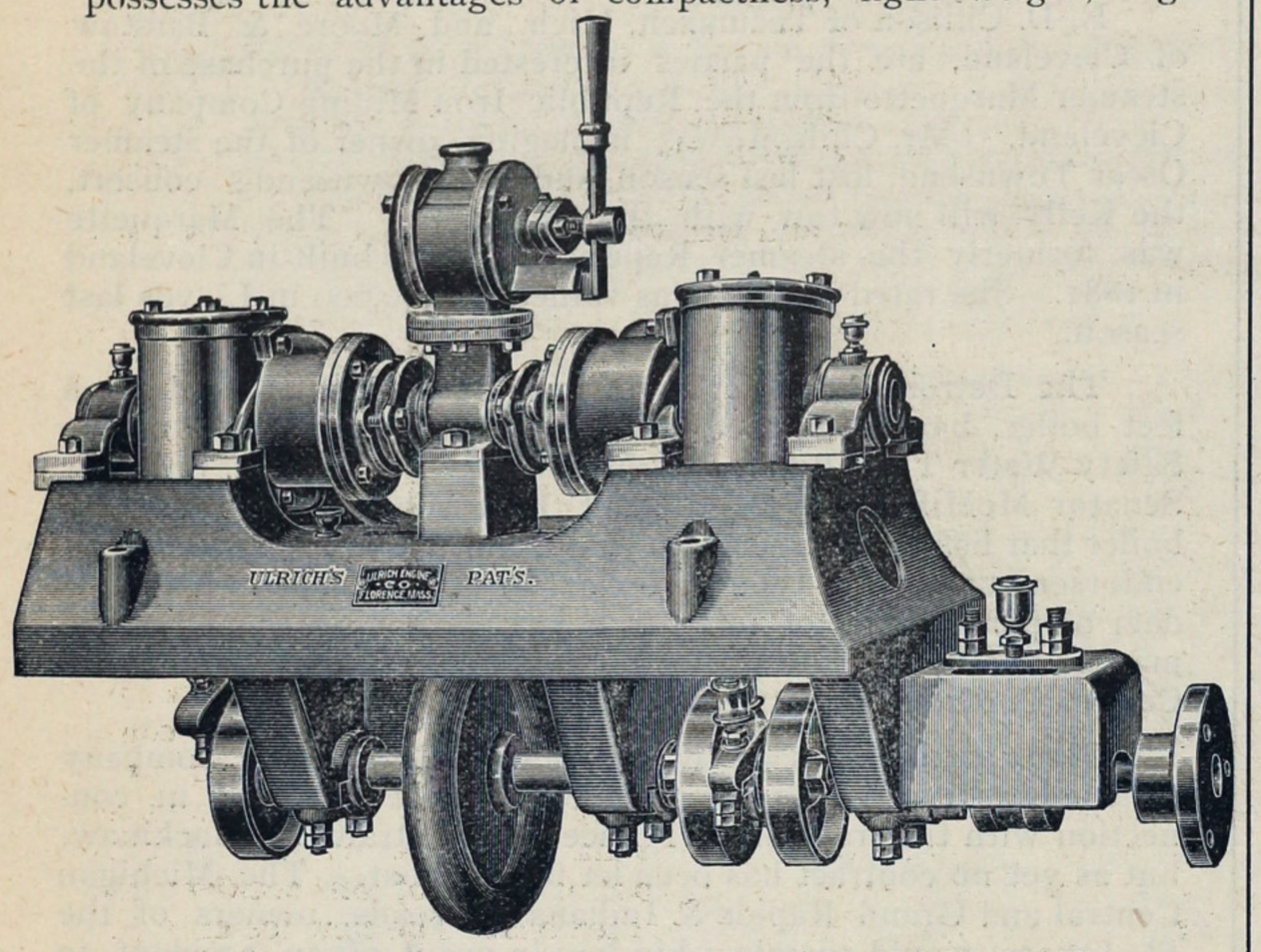
Electricity in Lake Elevators.

The Fisher Electric Company of Detroit recently completed the installation of an electric plant in the elevators of the Niagara company, Buffalo. The combination method is used, arc and incandescent lamps being burned from the same dynamo. The dynamo is the well known automatic machine constructed to operate from full to no load without adjustment or sparking at the commutator. The arc lamps are placed on the dock and in the freight yard and the incandescent lamps in elevators A and B. Portable lights are provided to drop into bins and to light ships when at dock. The arc lamps are placed on an incandescent circuit, while the elevators, where the incandescent lights are used, are divided into seven circuits, enabling the engineer to light from the engine room any part of the large establishment. The insurance companies holding risks on the elevators make a reduction of $1,500 a year in the cost of insurance, and it is figured that the electricity will be $600 cheaper in a year than gas. As the plant cost but $3,200, it will, at this rate, pay for itself in a year and a half.

Mr. W. M. Day, who has been editor of the Iron Trade Review of Cleveland since 1882, has retired on account of increasing duties devolving upon him as president of the Cleveland Printing and Publishing Company. His successor is Mr. A. I. Findley of Akron, an experienced newspaper worker. Mr. Day is still a director in the Iron Trade Review Company.

A Neat Duplex Yacht Engine.

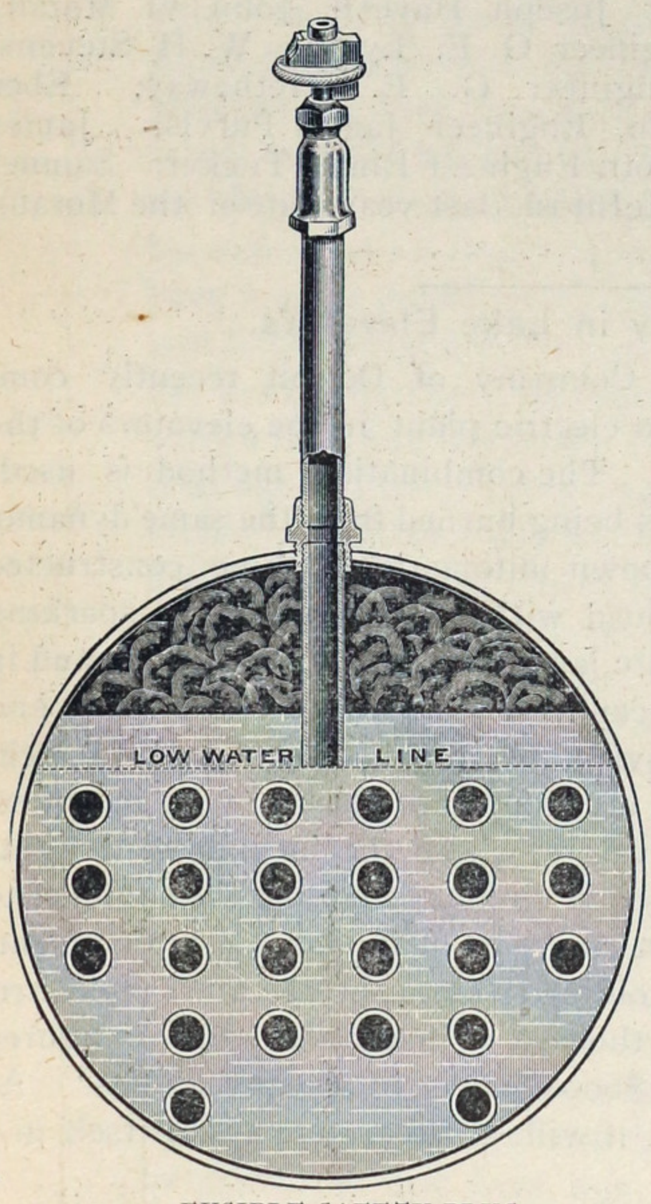
The cut below shows a yacht engine designed and built by the Ulrich Engine Company, Florence, Mass. It has two high pressure cylinders, but they can be made to work on the compound principle as do Ulrich engines of larger size. It possesses the advantages of compactness, light weight, high



YACHT ENGINE, BUILT BY ULRICH ENGINE COMPANY.

speed, low center of gravity and extreme simplicity. In addition to this it is provided with an ingenious reversing device, that is far simpler, acting quicker, and easier to manage than the link motion found on most other engines intended for similar work. All of these engines are provided with a thrust bearing, which housing is cast solid with the bed frame and takes up the end strain, causd by every propeller. Having two cylinders the engine will start at any position. The shaft lies nearer the keel than in any other yacht engine.

Low Water Alarm for Marine Boilers.



FUSIBLE SAFETY PLUG.

This week Van Auken's fusible locked safety alarm for indicating low water in marine boilers will be placed on the market. Every new steamer should have one on each boiler, and in fitting out they should replace similar devices in steamers that are not new. The boiler shell is tapped and the pipe run down within two or three inches of the flues or crown sheet. When the water in the boiler lowers to this point the steam will pass up in the device and melt the fusible disc, giving notice to the engineer that the water is near the danger line. This fusible alarm is not melted out by fire, but by steam acting on a fusible alloy which melts at 240 degrees. This alarm is not prevented from working by any accumulation of scale in the boiler. No stopping of power is necessary, for when the disc is melted out the steam can then be shut off and a new disc put in. This alarm is self-locked and provided with a valve between the fusible disc and boiler which can only be closed when the disc is melted out. This valve will enable escaping steam to be shut off and prevent the steamer becoming disabled on that account. The alarm can be furnished with or without whistle attachment, and is for sale by steam specialty dealers everywhere for $8. Write Van Auken Steam Specialty Company, Chicago, for circular showing other specialties.

Water Tube Boilers.

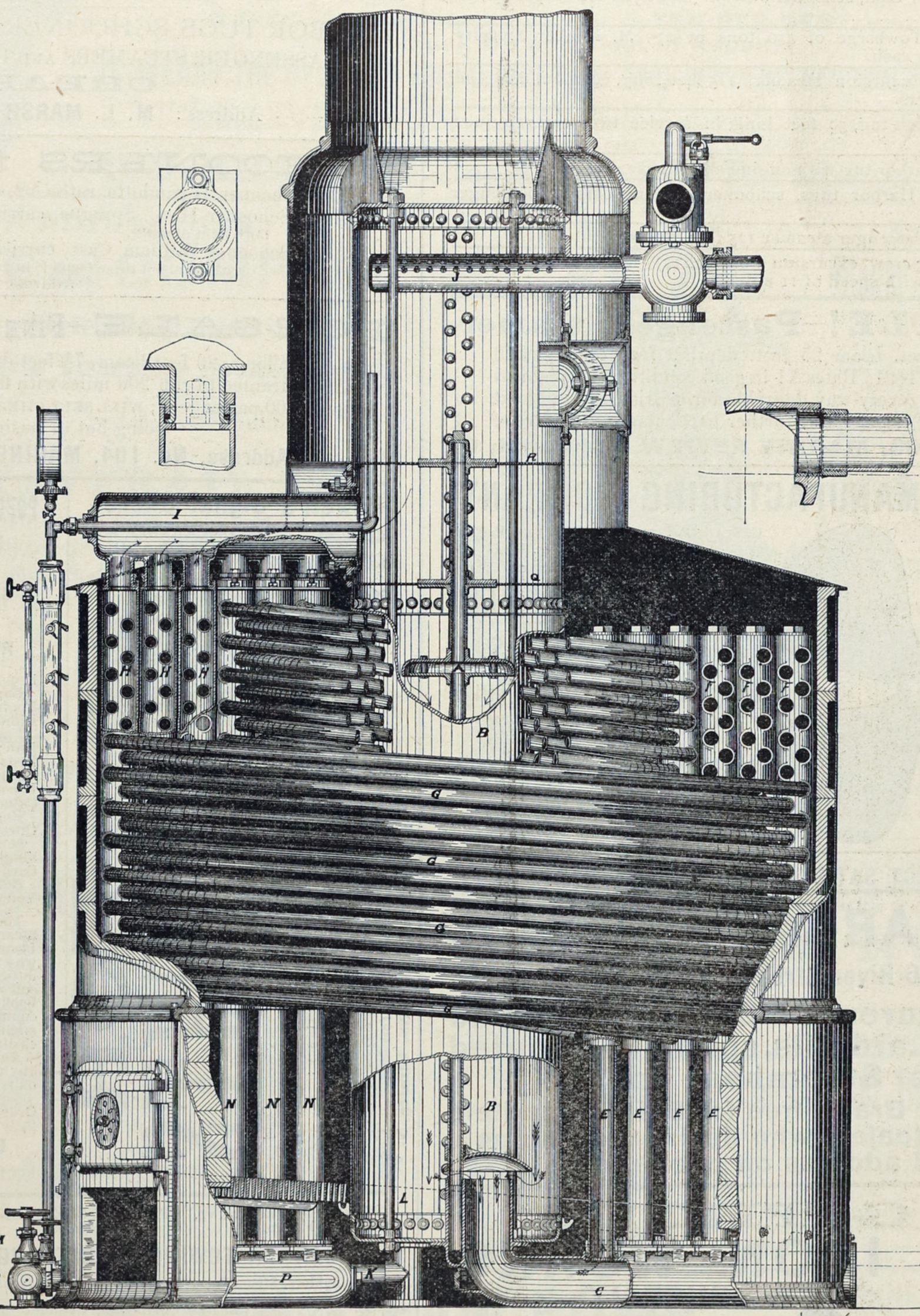
It is more than probable that within a very short period of time some lake freight steamers will be fitted with water tube boilers. Whether the water tube boiler will displace the Scotch type boilers remains to be seen, but there are numerous advantages in the former that will favor its adoption as soon as it may be said to have passed the experimental stage. This it has done in pleasure craft and as soon as the coast defense vessel, nearly completed at the Union Iron Works, San Francisco, is in service the results of the Ward tube boilers in this ship for the government will determine their advantages and undoubtedly gain the confidence of the merchant marine. To have the honor of making this advance in marine engineering would be worth the while of some lake ship builder, even if higher speed and greater carrying capacity are not taken into consideration. The following concerns are building water tube boilers for marine purposes: The Almy Water Tube Boiler Company, The Roberts Safety Water Tube Boiler Company, The Cowles Engineering Company, Murray & Tregurtha, The Babcock & Wilcox Company, and Charles Ward, Charleston-Kanawah, W. Va. Which company will succeed in equipping some merchant vessel is hard to tell, but the Ward and the Cowles boilers are the first to be brought into prominence in the navy through tests given them by the United States naval examining board, consisting of Chief Engineers Charles H. Loring, George W. Roche and George W. Magee, and J. J. Barry, past assistant engineer. To sum up the test the Ward boiler met the conditions laid down for adoption of water tube type and the navy department ordered them for the Monterey. Concerning these tests the technical and valuable magazine Industry of San Francisco, says:

"A few years ago the subject of water tube and sectional boilers admitted of discussion, and also of doubt, under the circumstances then existing, but since then the requirement of high pressure, due to the introduction of highly expansive engines, and the improvements that have arisen in the construction and adaptation of this class of boilers have given them a permanent place in the power economy of the world. We cannot help a word of commendation for Mr. Ward, who, from an unexpected part of the country, had the confidence to enter into these tests and secure the contract for the Monterey."

The amount of fuel consumed per square foot of grate surface in the Ward boiler, tested at Charleston, W. Va., was 55.04 pounds. The evaporation, per pound of fuel, was 6.5 pounds of water. This statement is independent of colorimetrical qualification, and is a kind of average. On the opposite page will be found an illustration of the Ward boiler and following is an explanation of designating letters:

The feed water being introduced at h, or any convenient point, is conducted by an internal pipe (having an inverted "rose," a, on its end,) to the center of main cylinder, b, where, in its slow descent in small jets, it becomes heated by contact with the surrounding water and at once precipitates the mud into the bottom of the drum, l, before entering the tubes. The generator being filled to the proper water line and fire introduced, it is evident that the heat developed is rapidly absorbed by the water in the tubes g, which, becoming rarified and expanded at once, pours over through manifold i, into the central cylinder b, causing an active circulation to and from the same through the lower horizontal manifold c, vertical manifolds e e e, generating tubes g, and upper manifold i. The heavier remaining water descends again to make the circuit. Any tendency of the water to follow the steam to the steam pipe j, is prevented by perforated diaphragm introduced in the center cylinder b, just above the upper horizontal manifold i, causing the steam to rise through numerous small holes over the area of the cylinder. To avoid the disastrous result of unequal expansion and contraction, every individual piece is free to expand or contract independent of any other. These generators have been thoroughly tested, with success, during the past eleven years on steamers and tugs; they are inspected by United States inspectors, tested to 300 pounds and allowed to carry 200 pounds steam pressure.

A boiler of this kind having 1,300 square feet of heating surface can be put on a floor space of 48 square feet. The Ward boiler is specified for the United States revenue cutter Hudson, for which bids were recently opened.



D. Percy Kemble. 12/8/1884

Scale

WARD'S STEAM GENERATOR.

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N24.

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109—FOR SALE—Screw excursion steamer 112½ feet over all, 20½ feet beam, 7½ feet deep with speed of 11 miles.

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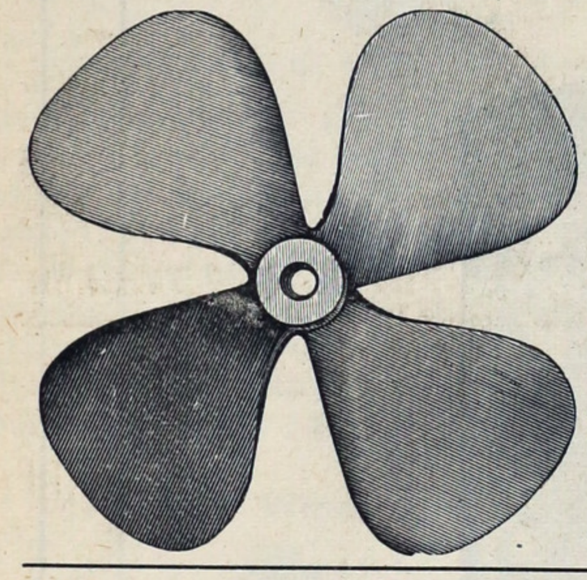

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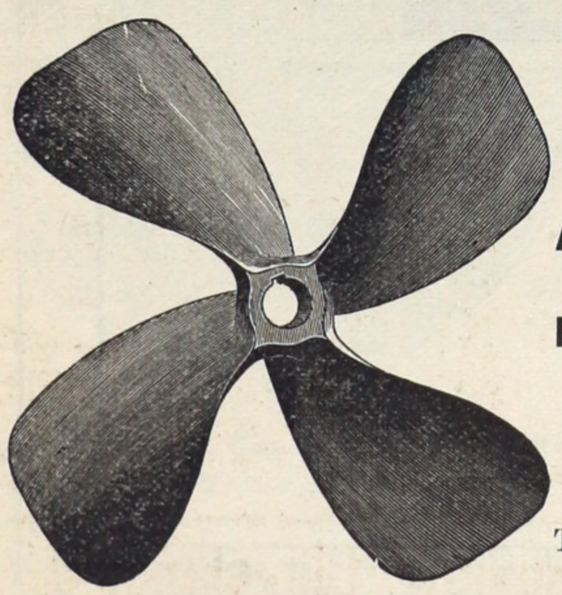

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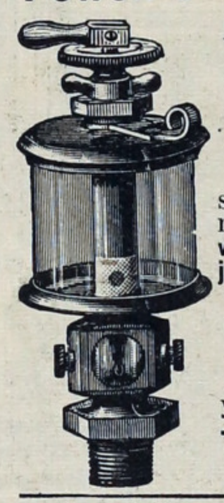

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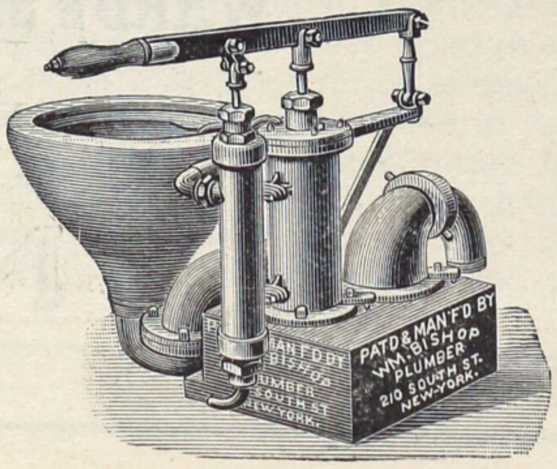

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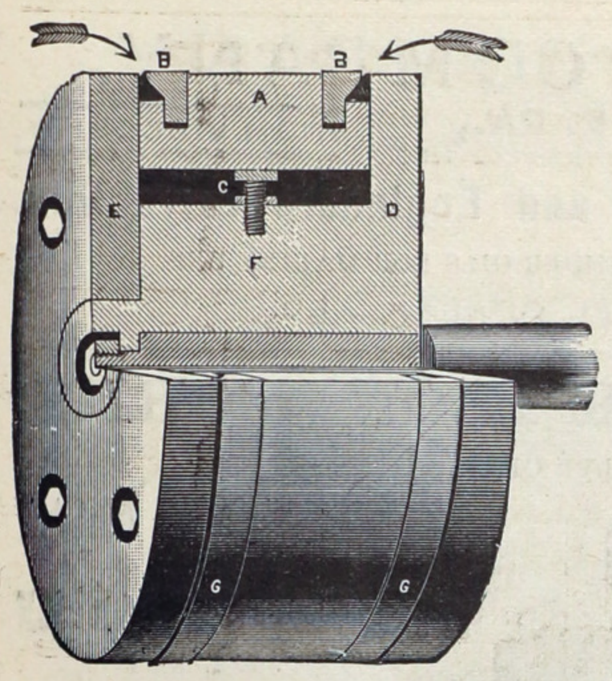

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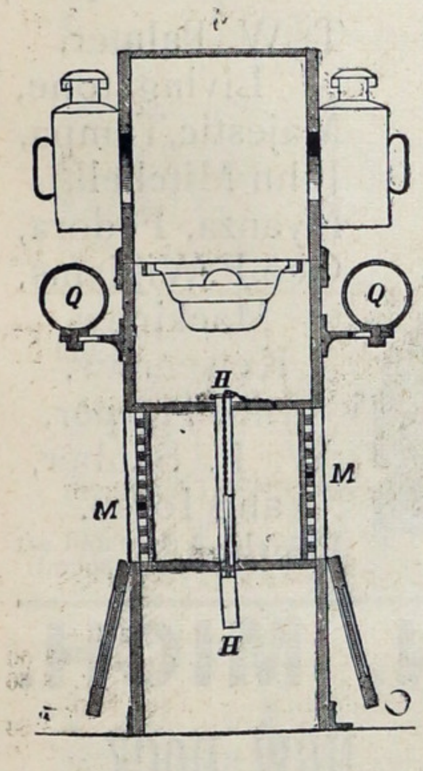

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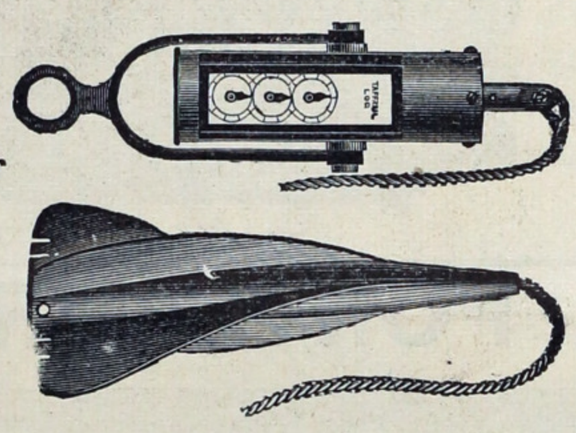

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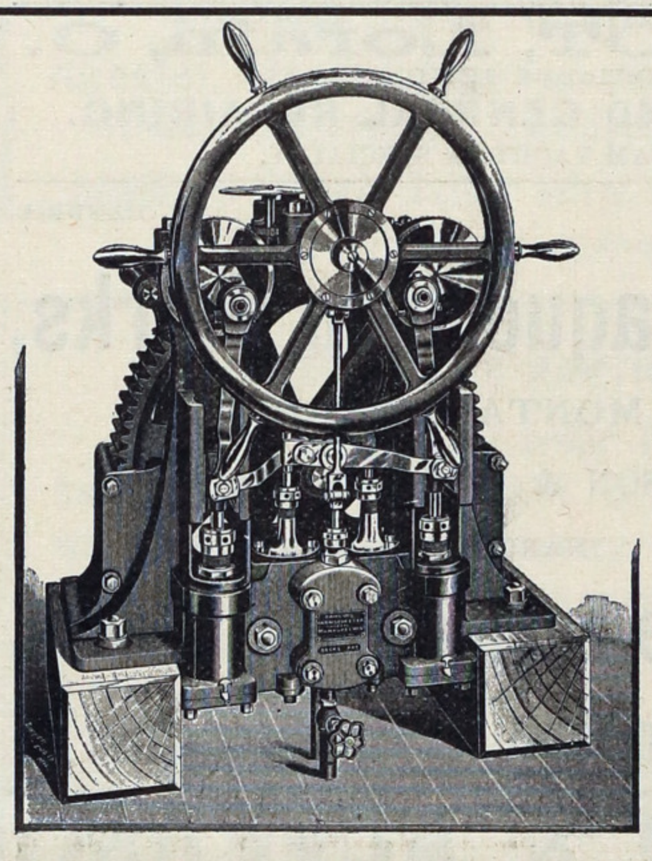

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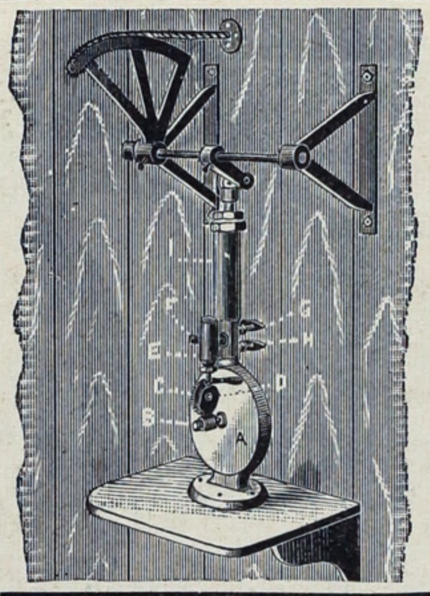

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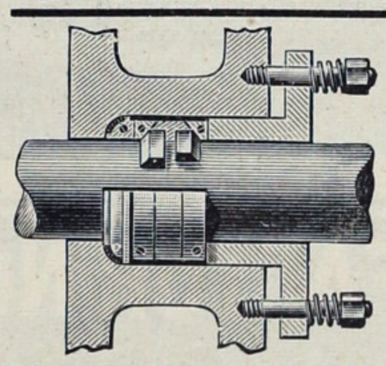

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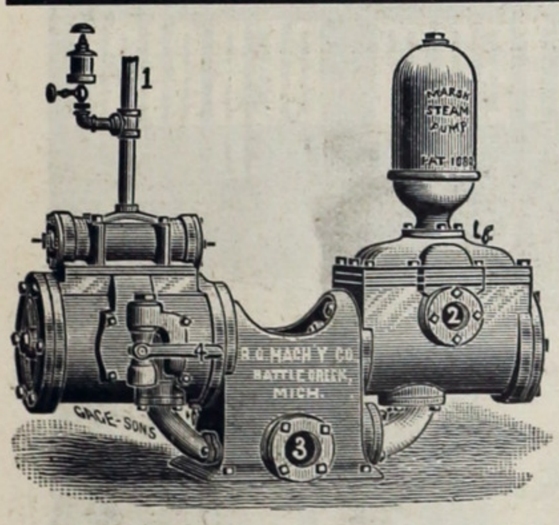

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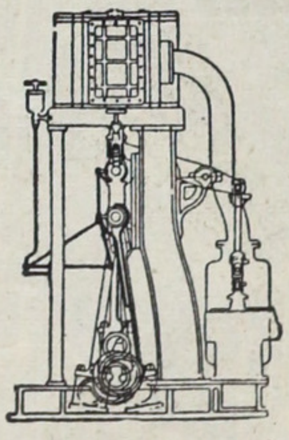

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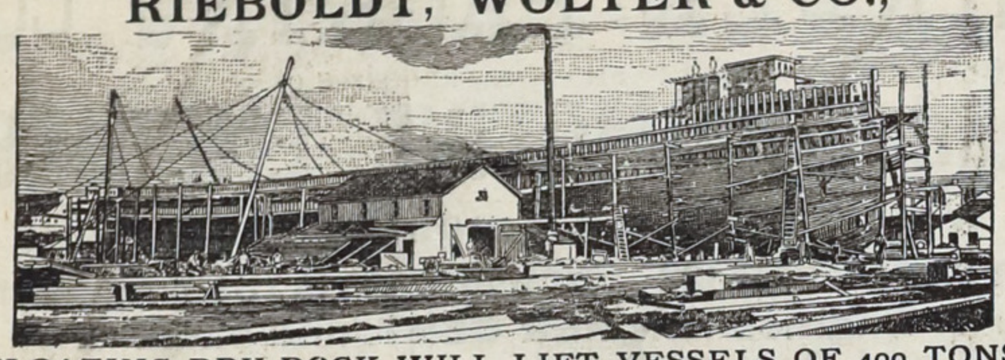

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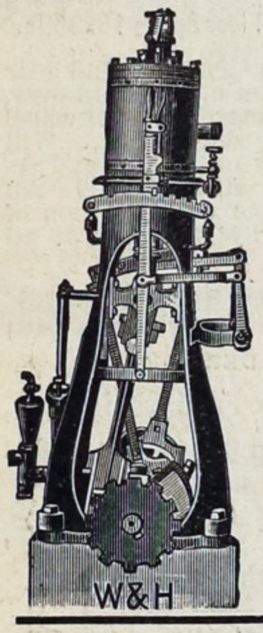

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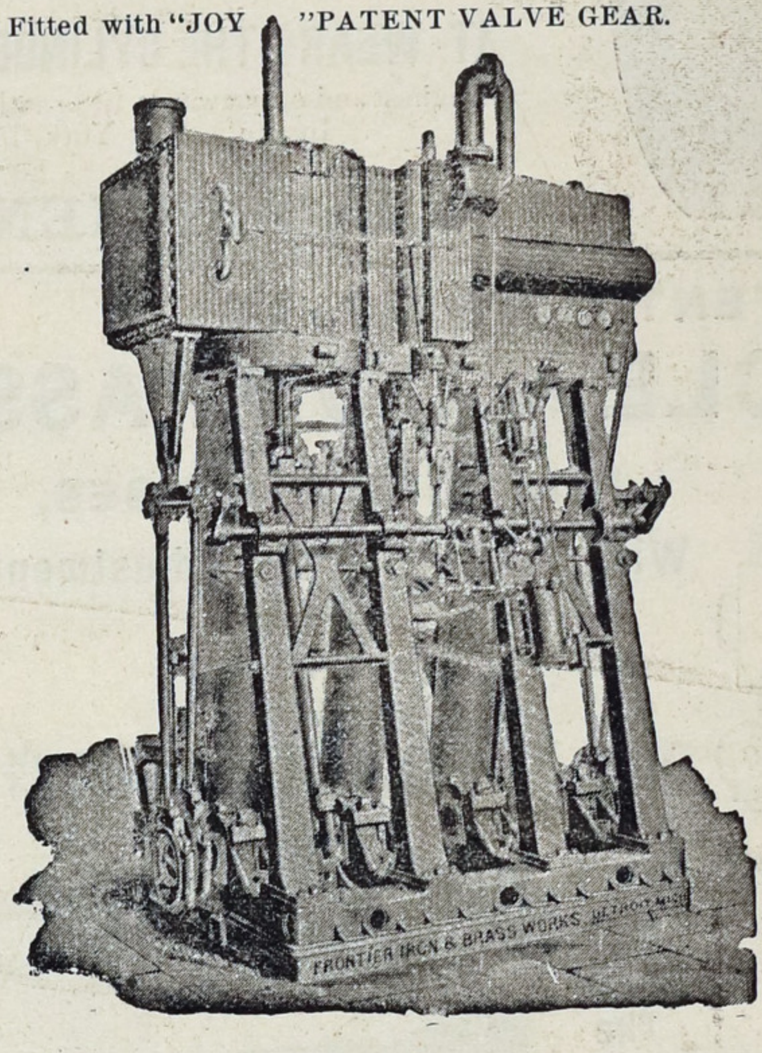

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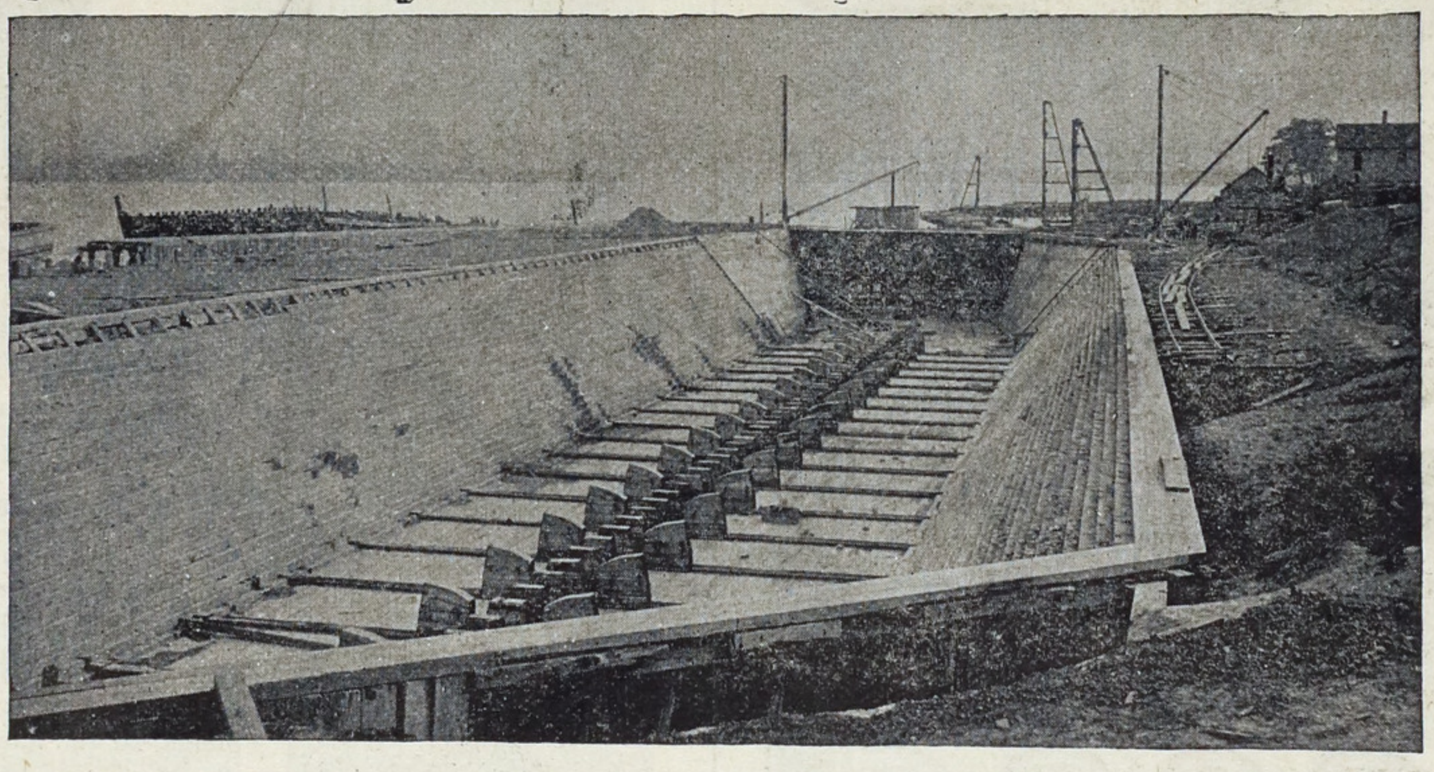

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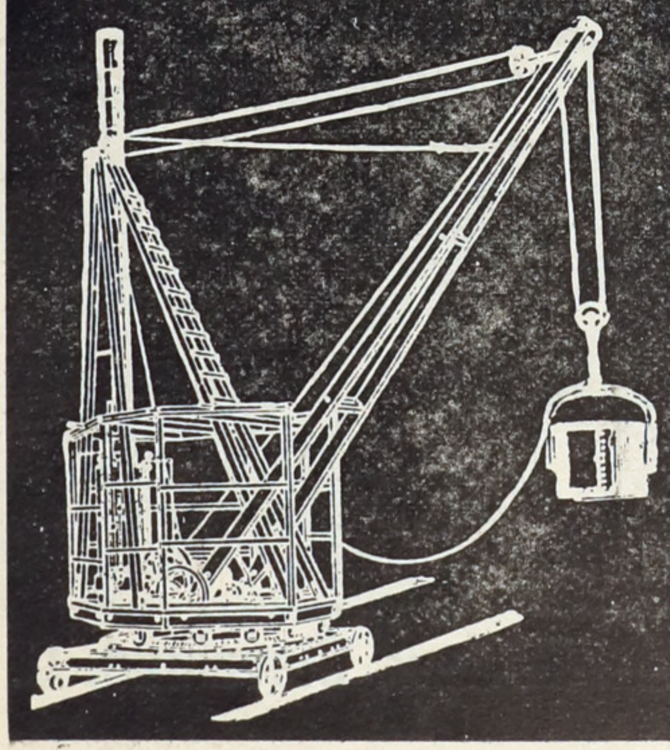

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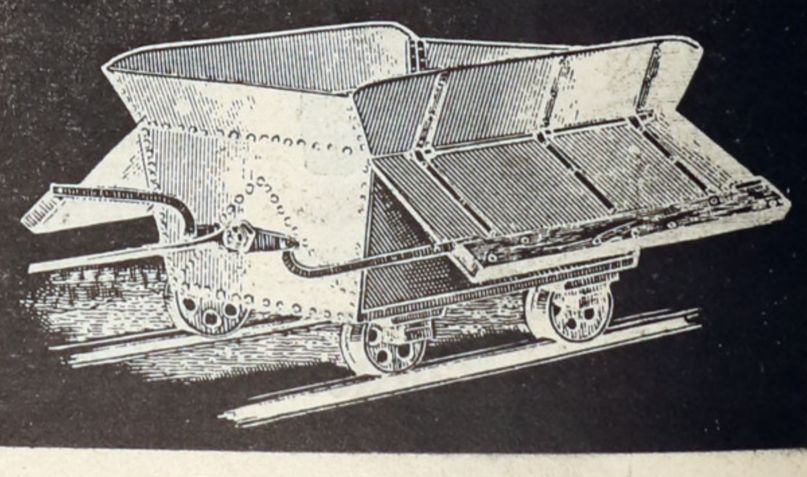

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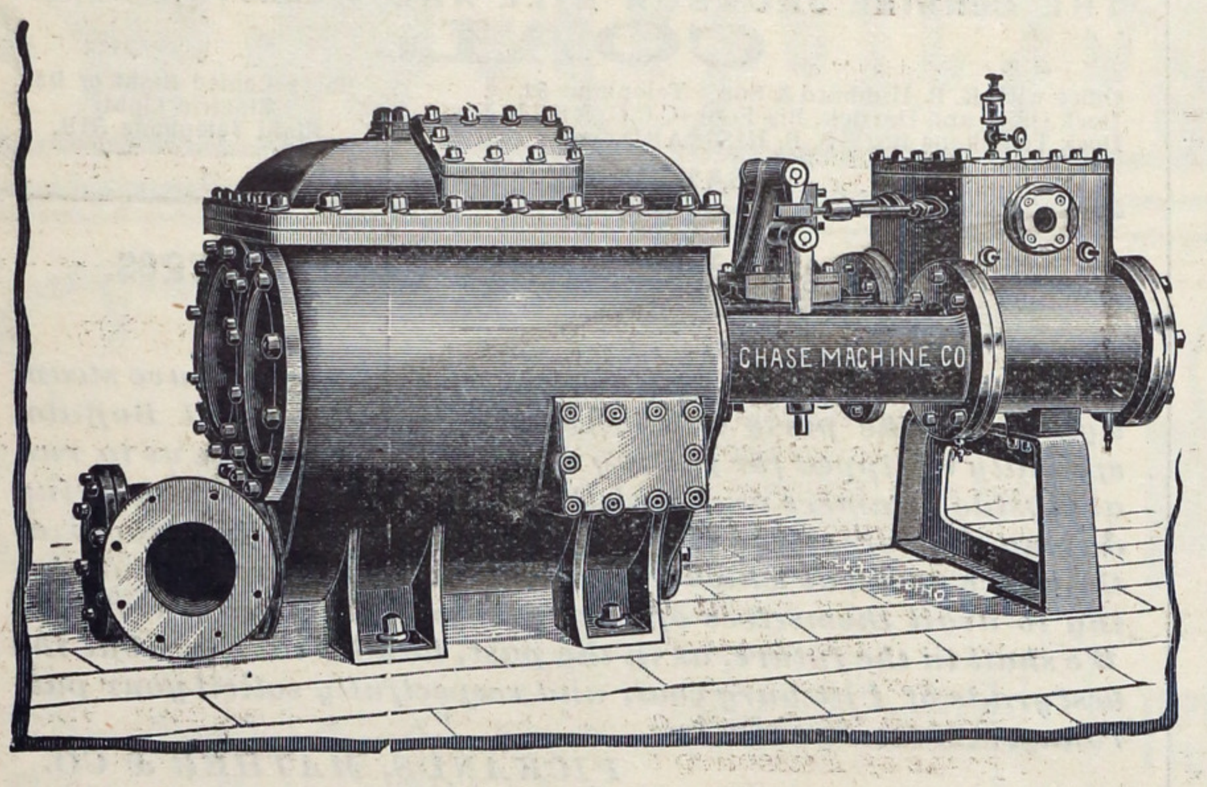

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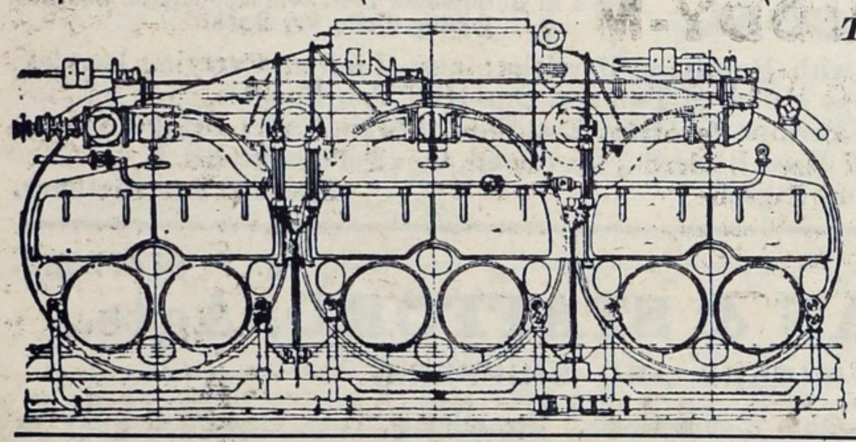

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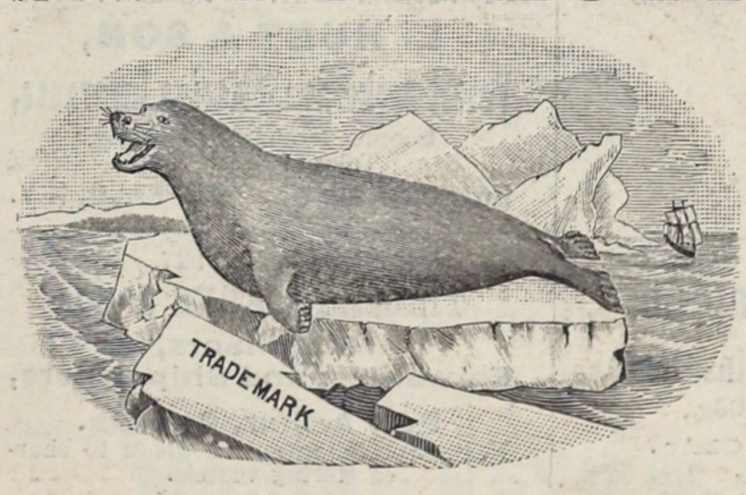

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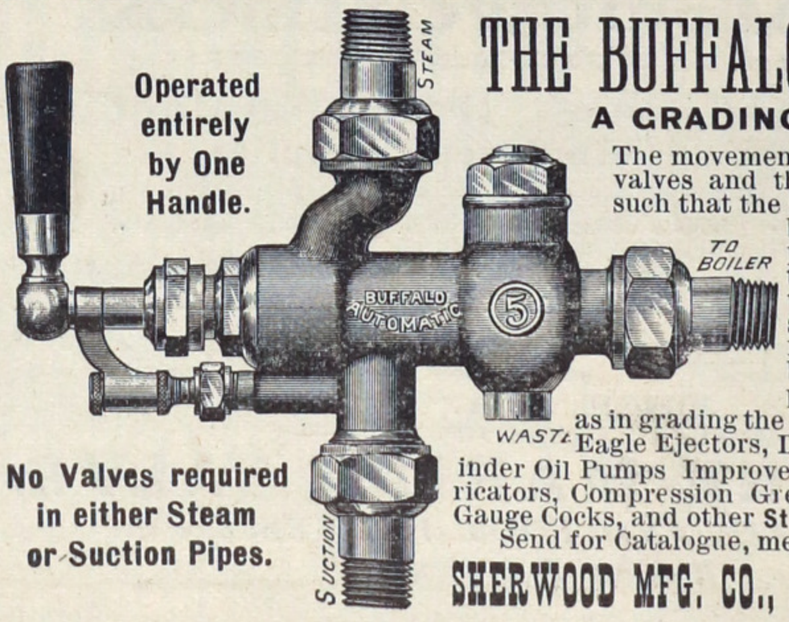

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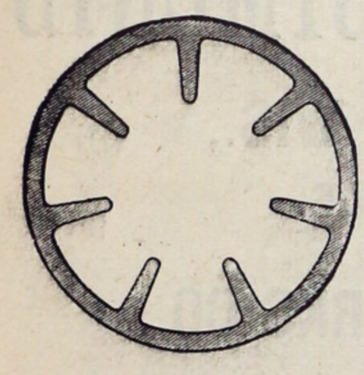

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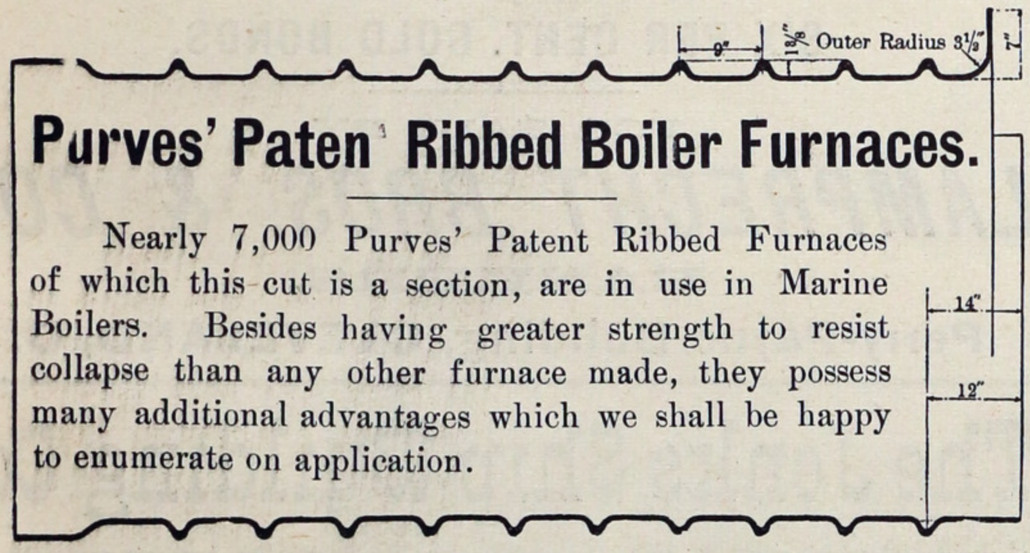

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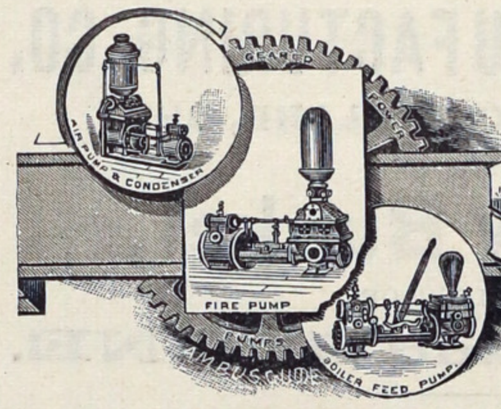

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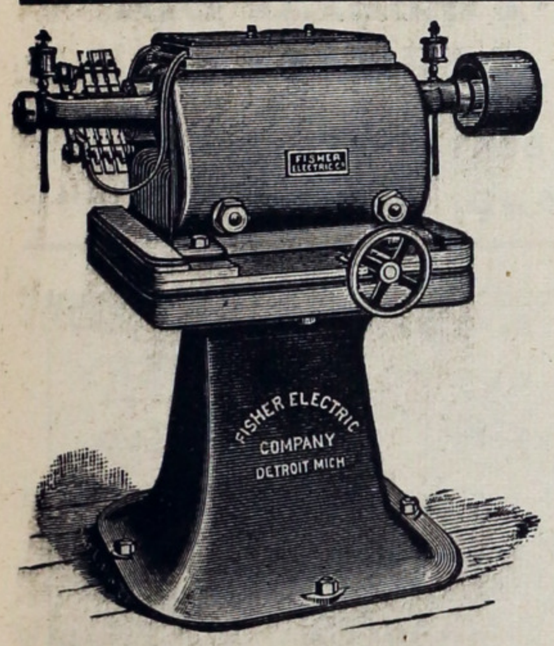

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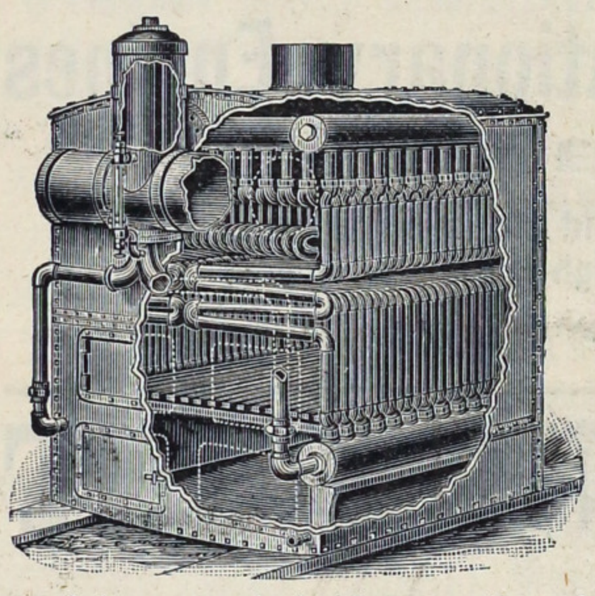

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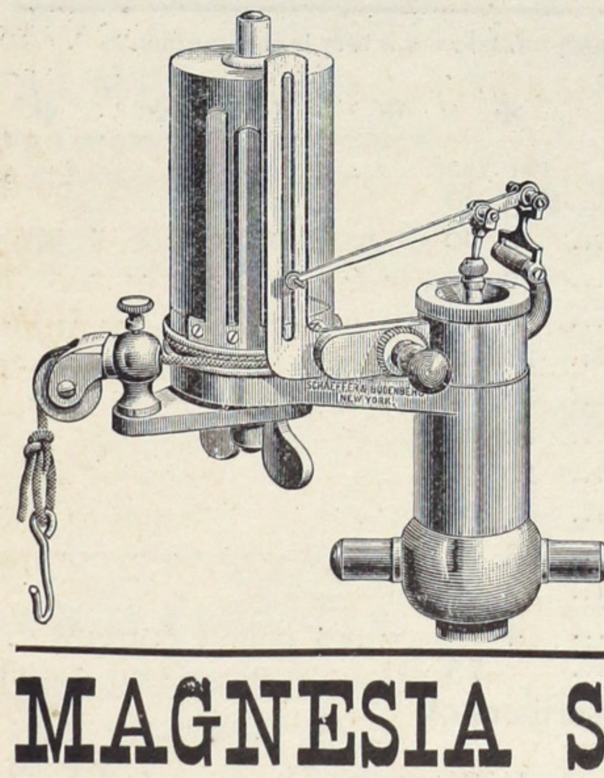

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